

Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I

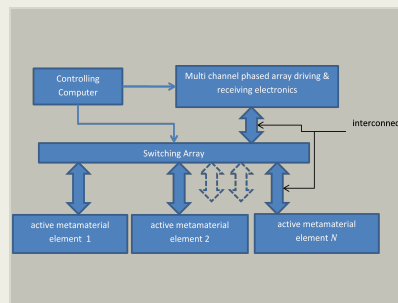
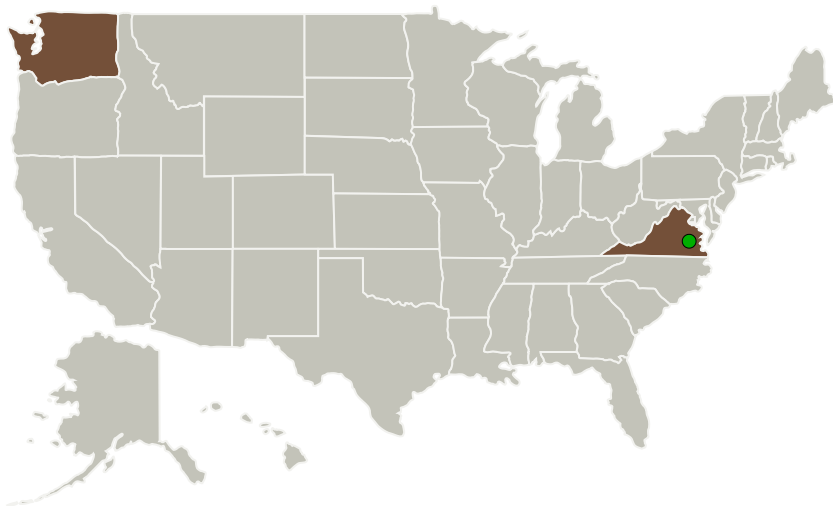
Completed Technology Project (2016 - 2016)



Project Introduction

An active and tunable metamaterial phased array transducer for guided wave mode selection with high intensity per driving channel and with dramatically lower modal noise when compared to the state of the art. The innovation exploits aspect of phased array based guided wave mode selection theory, whose practical significance seems to be ignored in the state of the art. These aspects include a) low modal noise when the phased array has small inter-element distance and a large number of elements and; b) phased delays necessary for driving the phased array elements have an apparent periodicity and anti-symmetry. As a consequence of exploiting the first factors the proposed phased array transducer can be classified as an active tuneable metamaterial. The second factor is mentioned above is exploited to reduce the number of driving channels by using switching matrices to interface between the driving channels and the metamaterial transducer. Fidelity of inspection and cost-effectiveness are the primary features of the innovation.

Primary U.S. Work Locations and Key Partners



Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I

Completed Technology Project (2016 - 2016)



Organizations Performing Work	Role	Type	Location
Quest Integrated, LLC	Lead Organization	Industry Small Disadvantaged Business (SDB)	Kent, Washington
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

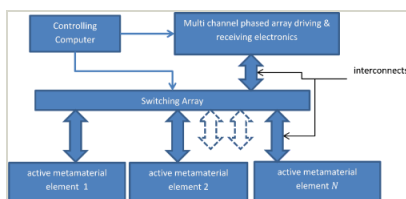
Virginia	Washington
----------	------------

Project Transitions

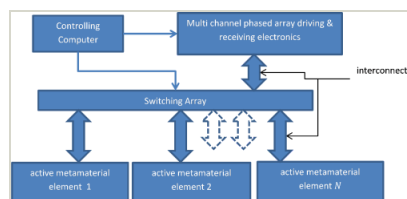
**June 2016:** Project Start**December 2016:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139645>)

Images

**Briefing Chart Image**

Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I
(<https://techport.nasa.gov/image/129630>)

**Final Summary Chart Image**

Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I Project Image
(<https://techport.nasa.gov/image/131910>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Quest Integrated, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

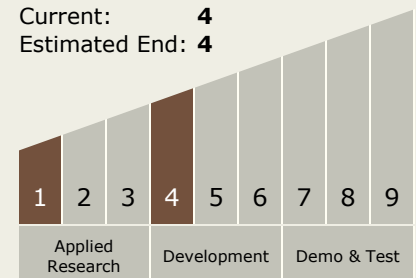
Carlos Torrez

Principal Investigator:

Haraprasad Kannajosyula

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Active Metamaterial Based Ultrasonic Guided Wave Transducer System, Phase I

Completed Technology Project (2016 - 2016)



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System